

SHORTER NOTES

***Salvinia molesta* in Mexico.**—The genus *Salvinia* Ség. comprises ten species of mostly tropical ferns that are floating aquatics or less commonly stranded on receding shorelines. Among these, perhaps the best known is *S. molesta* D.S. Mitchell (Kariba weed, giant salvinia, giant water spangles), which is notorious as an extremely aggressive invasive exotic in both the New and Old Worlds. This species is extremely fast growing and has the capacity to cover the surface of even large bodies of standing and slow-moving water, forming so dense a continuous mat that oxygen exchange is inhibited and light passage is precluded, to the detriment of other aquatic organisms. Because it is a sterile pentaploid ($n=45$; Loyal and Grewal, *Cytologia* 31: 330–338. 1966), *S. molesta* reproduces only vegetatively by fragmentation and regrowth; thus humans, waterfowl, and surface drainage are the main dispersal agents. The taxon first came to the world's attention in the 1930s, when plants inadvertently released into a lake in Sri Lanka quickly grew into a major infestation. Subsequently, it caused similar problems in portions of Australia, India, southeastern Asia, and Africa (Moran, *Fiddlehead Forum* 19[4+5]: 26–28. 1992). It was not until 1972 that the taxon was correctly determined to represent an unnamed species and was described as new to science, based on plants infesting Lake Kariba, along the border between Zambia and Zimbabwe (Mitchell, *Brit. Fern Gaz.* 10: 251–252. 1972). In the United States, *S. molesta* and its relatives are considered noxious weeds under the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS) and thus are prohibited by law from international import or interstate shipment.

Salvinia molesta is a member of the *S. auriculata* Aubl. complex, which consists of four taxa, all native to South America and Trinidad (Forno, *Aquatic Bot.* 17: 71–83. 1983). All of these taxa (but in particular *S. molesta*) are considered potentially severe aquatic weeds outside of their native ranges. Forno and Harley (*Aquatic Bot.* 6: 185–187. 1979) were the first to discover native populations of *S. molesta* growing at relatively low elevations in temperate southeastern Brazil. Curiously, although the species has proliferated in the Old World tropics, it apparently has not spread significantly thus far in the neotropics (Moran, *Fl. Mesoamer.* 1: 396–397. 1995).

The introduction of *S. molesta* into temperate North America is very recent. Nauman (*Flora of North America* 2: 336–337. 1993) saw no wild-collected material, but mentioned that it was a candidate for future escape based on its cultivation in Florida. The species was first reported in the wild from a small pond in South Carolina (Johnson, *Aquatics* 17[4]: 22, 1985), soon thereafter from a reservoir in eastern Texas and adjacent Louisiana (Jacono, *Sida* 18: 927–928. 1999), and subsequently from several other southeastern states (Jacono *et al.*, *Castanea* 66: 214–226. 2001). At about the same time, infestations were first noted in agricultural canals in southeastern California, and subsequently in the Colorado River. *Salvinia molesta* was first reported as present on the

Arizona side of the Colorado River by Tellman (Plant Press [Tucson] 23[3]: 4, 14, 1999) and has been documented from both La Paz and Yuma Counties (Yatskievych and Windham, *Canotia* 4: 46–49, 2008). In California, it was first reported by Jacono and Pitman (Aquatic Nuisance Species Digest 4: 13–16, 2001). Outside the Colorado River drainage and adjacent agricultural canals in Imperial and Riverside Counties, the Consortium of California Herbaria website (<http://ucjeps.berkeley.edu/consortium>) now records sporadic occurrences west to San Diego County and northward to San Luis Obispo and Mendocino Counties (we have not verified these specimens).

In the recent, comprehensive account of Mexican pteridophytes (Mickel and Smith, *Mem. New York Bot. Gard.* 88: 1B1054, 2004), only two species of *Salvinia* were treated (*S. auriculata* and *S. minima* Baker); *S. molesta* was not mentioned. We recently were made aware of the existence of an apparent 2002 collection from the Villahermosa area in Tabasco (C. Jacono, U.S. Geological Survey, pers. comm.), which may be the earliest documented infestation of the species in the country. Given its presence in the Lower Colorado River drainage of Arizona and California, it also is not surprising that *S. molesta* should eventually become established in adjacent portions of Mexico. Anecdotal reports place the time of its first discovery in northwestern Mexico during 2003. An online document issued by the Lower Colorado River Giant *Salvinia* Taskforce (<http://www.lcrsalvinia.org/accomplishments/Mexico-PRES%20SM%20BLYTHE%2029-JUN-05.pdf>) provided photographic evidence of the presence of the species in Baja California and maps its presence nearly throughout the Mexicali Water District. Until recently, we had not seen a voucher specimen in support of these reports, but our colleague, Richard Felger, kindly collected one at our request: MEXICO, Baja California, Mpio. Mexicali, ca. 0.3 km S of Presa Morelos, wetland with stagnant water pools and sandy-silty river soils, floating aquatic, forming 100% cover on some small, stagnant pools and common at edge of large pools, 32°42'16.0"N, 114°43'44.4"W Long., elev. ca. 108 ft, 16 Mar. 2006, *R. S. Felger et al.* 06-5 (BCMEX, MO, SD, UC).

Despite all of the attention given to the presence of *S. molesta* in Baja California, the species apparently has not been reported officially from the state of Sonora. However, a recently located voucher specimen was collected by the eminent Mexican aquatic plant researcher, Alejandro Novelo R.: MEXICO, Sonora, Mpio. San Luis Río Colorado, Canal de riego El Barrote, 16 km SO de San Luis Río Colorado, vegetación acuática, herbácea, hidrófita libremente flotadora de 0.10 m, asociada a *Myriophyllum* y *Potamogeton*, 7 Oct. 2004, *A. Novelo R.* 4566 (MEXU).

Water that enters Mexico in the Colorado River (much of it pumped from deep wells in the desert south of Yuma, Arizona) is impounded behind the Presa Morelos, forming a reservoir that provides water for irrigation of crop fields and other human uses through a complex series of ditches and canals. The stretch of the river from below the dam to its mouth at the Gulf of California has additional water diversions. *Salvinia* can be spread by water flow through the system, as well as by human activities and waterfowl that

utilize the water and transport pieces of plant in mud attached to their feet and feathers. It seems likely that in coming years the species will continue to become increasingly common in both northeastern Baja California and northwestern Sonora. The Lower Colorado River Giant Salvinia Taskforce has completed experimental releases of the biocontrol agent for the weed, a weevil native to southern Brazil called *Cryptobagous salviniae* Calder & Sands (Coleoptera: Curculionidae), which has been used successfully in some tropical countries of the Old World (Thomas and Room, *Nature* 320:581–584. 1986; <http://www.lcrsalvinia.org/weevil.htm>). Some stands also have been sprayed seasonally with herbicides, but thus far these efforts have not succeeded in stopping the spread of *S. molesta* in the Lower Colorado River.—ARTURO MORA-OLIVO, Instituto de Ecología Aplicada, Universidad Autónoma de Tamaulipas, 13 Blvd. Adolfo López Mateos No. 928, 87040 Cd. Victoria, Tam., México, and GEORGE YATSKIEVYCH, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166 U.S.A.

Type Specimens of *Dracoglossum sinuatum* Uncovered in the Rio de Janeiro Herbarium.—During a recent survey of the A. L. A. Fée collections in the Jardim Botânico herbarium, Rio de Janeiro (RB), some specimens belonging to the newly published fern genus *Dracoglossum* Christenhusz (*Thaiszia* J. Bot. 17:1–10. 2007) were uncovered. These specimens are original material cited in the descriptions of *Bathmium macrocarpon* and *B. sinuatum* by Fée (*Mém. Foug.* 5. Gen. Filic.:288. 1852), but previously were not recognized as types. These specimens both belong to the same species: *Dracoglossum sinuatum* (Fée) Christenhusz.

Bathmium macrocarpon Fée is an illegitimate name, as stated by Christenhusz (2007), but Morton (*Amer. Fern J.* 56:123. 1966) erroneously took the name as a legitimate basionym and thus unintentionally established a new name: *Tectaria plantaginea* (Jacq.) Maxon var. *macrocarpa* C.V.Morton, with Fée's specimen (French Guiana, Cayenne, *Poiteau s.n.*, anno 1825) as the type. Morton assumed that this specimen was in Paris, without consulting P, but the isotypes found there are originally from the herbarium of Caen (CN), and had nothing to do with Fée. The specimen in RB is from Fée's herbarium and annotated by him and is therefore the holotype.

The specimen of *Bathmium sinuatum* was cited by Fée (1852) as "Habitat in Guyana, *Leprieur s.n.* in Herb. Moug.". The Mougeot herbarium was deposited in the herbarium of Montpellier (MPU) but this specimen is not present here. Since the specimen was considered lost, Christenhusz (2007) designated a neotype. Nevertheless the specimen in RB is original material from the Fée collection and thus it is the holotype, superseding the designated neotype.—MAARTEN J. M. CHRISTENHUSZ, Department of Biology, University of Turku, 20014 Turun yliopisto, Finland.